OFFICIAL PUBLICATION OF THE AMERICAN SOCIETY OF MINING AND RECLAMATION

reclamation matters

Fall 2016

Highlights of the 2016 Spokane ASMR Meeting

Life Changing! Report of the University of Wisconsin-Platteville Student Trip

Reclamation of the Abandoned Spenceville Mine

Call for Abstracts – 2017 Joint Conference Morgantown, West Virginia

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reclamation matters

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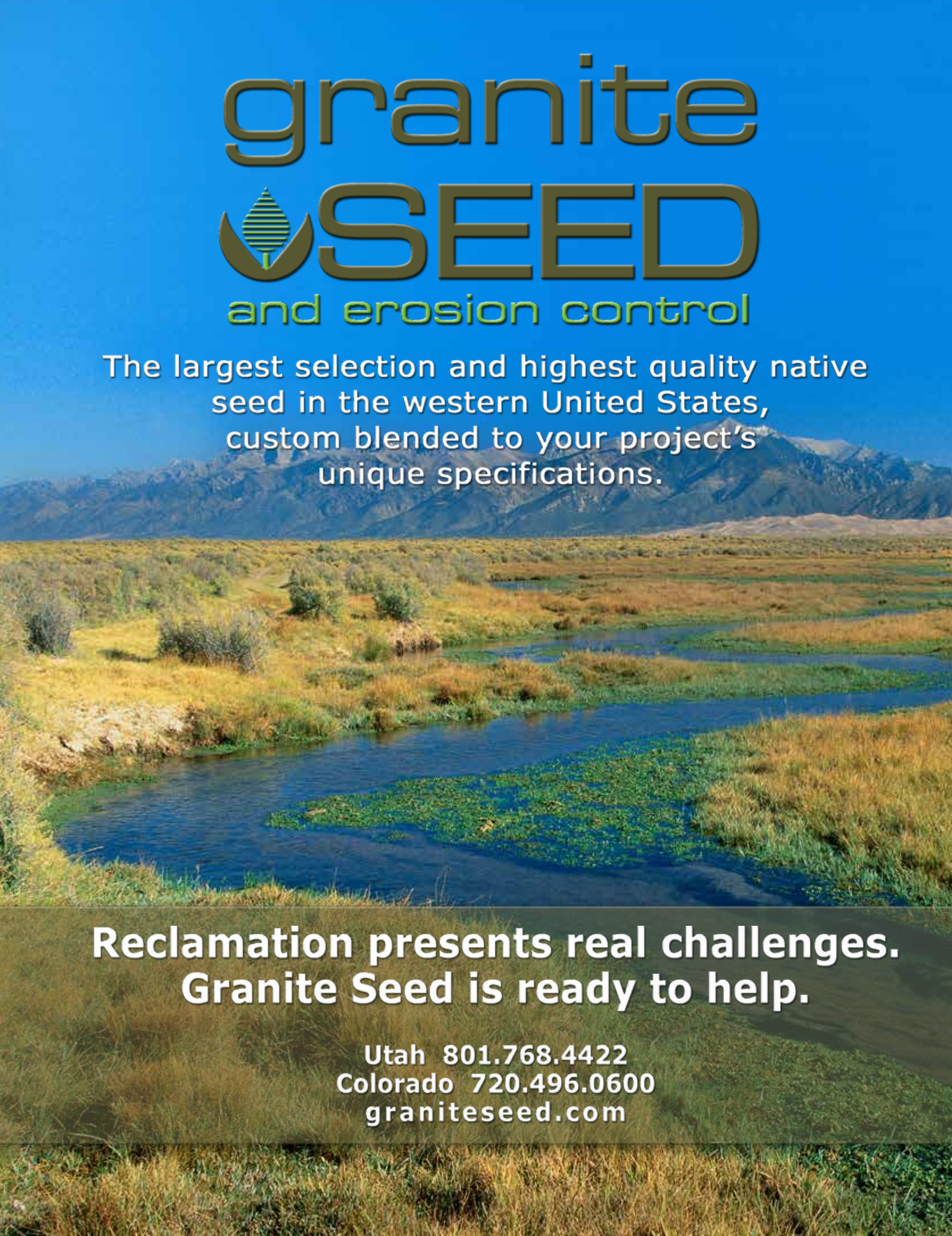
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EDITOR'S MESSAGE

Does Reclamation Matter?

By Jeff Skousen

This is the 26th edition of *Reclamation Matters*. This publication started in 2004 with the Spring issue. I recently read my first editorial in that issue and thought that a part of it was useful for this edition more than 12 years later.

Welcome to Reclamation Matters, *the new American Society for Mining and Reclamation magazine. The title is an obvious play on the word "matters." First, all of us would agree that reclamation does indeed matter. Many of our members and readers are employed by mining and reclamation companies or are engaged in supporting these industries. And certainly, we feel strongly about reclamation research, strategies, processes, practice, and success.*

The second part of the "matters" name refers to the ongoing activities, events, new ideas and technologies that are being recognized and discovered. This magazine will be devoted to discussing some of these "reclamation matters" in an open, informal, and illustrative fashion. Therefore, the name of the magazine denotes that 1) we care about reclamation and 2) we are continually learning more about mining and reclamation issues and technology, and the need to inform others.

While sitting in a meeting describing budget cuts and faculty reductions, I was reminded of an experience many years ago. At a similar budget cut meeting decades ago when I was a young assistant professor, I wondered to myself if the area in which I worked was important. Why should I care about this small area of mined or disturbed land since it only amounted to about 4% of the total land area of West Virginia? Certainly the impact of that small of an area on the state as a whole cannot be particularly significant. Nationally, disturbed lands probably account

Rocky Mountain Bio Products .25 Cheryl

for <1% of the total land area. Should there be a position at my university that is largely focused on disturbed lands and reclamation?...

My boss later answered my question. He said, "These disturbed areas are some of the most important lands in the state! These areas provide energy, opportunities for work, and huge financial contributions to this state in taxes and income. However, these areas can be some of the most significant producers of potential environmental damage and can degrade the state's soil, water, and air resources. These areas are crucial to the life of the state, but they can also be responsible for high levels of degradation to the state's environment."

His message rang true to me then and still continues to ring true today... I have tried to always remember that our reclamation work does indeed matter, that we can control and reduce environmental impacts on some of the area's most important lands and, even though the disturbed areas may be small on the total landscape, the disturbance can be potentially very damaging to nearby water and land resources, and for long-term land use development.

The purpose of our society and the reclamation industry is to make a difference, to balance the needs of our society for minerals, energy, and other resources while protecting and enhancing the environment, to devise and develop new and better ways of reclaiming disturbed lands, and to share this information with each other.

So that's what I said then, and that's still my plea to you today. Reclamation does matter! We just concluded a great annual meeting in Spokane, WA. I encourage you to attend our annual meeting in 2017 in Morgantown, WV, where three groups will be joining to host a tremendous mining, reclamation, and water conference. Please see the Call for Abstracts and plan on coming to this historic meeting in April 2017. ■

Early Career Professionals Update

By Cindy Adams

We had a great turnout at the Spokane Early Career Professionals outing. Thanks go to Cally Driessen and the Spokane Planning Committee. There were a lot of good conversations between experienced professionals and early career professionals and students. I'd also like to recognize the first Early Career Award in Reclamation recipient – Melissa Van Scoyoc. Melissa is the GIS lead and coordinates the Habitat Restoration Program for the Salmon River Restoration Council. Congratulations Melissa!

The ASMR Annual Meeting is a great conference and there are many opportunities to stay engaged throughout the year. This article highlights some ways to stay connected. I hope you will find an opportunity to connect with other ASMR members this year, whether it is face to face, email, or social media.

Connect with other members on social media. Share information with the society on either Facebook or Linked In. ASMR has an open group on Facebook and a LinkedIn page. The Wild Women of Reclamation also has a LinkedIn page. Consider joining one or all pages and participate in discussions regarding reclamation, research, and other interesting articles relevant to the field. See the ASMR website for the links, or I can assist you as well.

Join or start a student chapter of ASMR at your university. Student chapters are a great way to have comradery and provide additional opportunities for scholarships. In the next article, I plan to highlight the happenings in ASMR student chapters. Current ASMR student chapters are at:

- Saint Francis University
- University of Kentucky
- University of Wisconsin, Platteville
- University of Wyoming

If you attend a university not listed above and are interested in creating a student chapter of ASMR, please contact ASMR Secretary Robert Darmody for more information. A student chapter starts with at least five student (undergrad or graduate) members who are interested in reclamation of disturbed lands or in Ecology, Forestry/Wildlife, Geotechnical Engineering, International Tailings, Land Use Planning and Design, Soil Overburden, or Water Management as they relate to reclamation.

Nominate a colleague for the Early Career Award in Reclamation. The award recognizes an early career member of ASMR in reclamation research, teaching, and/or on the ground reclamation (either with industry, regulatory agency, or reclamation contractor). The nominee must have been employed in their field for a minimum of three (3) years but not more than ten (10) years. Nominations are due mid-January, so start thinking now who would be a good colleague to nominate. For more information on the nomination process see the ASMR website.

Each year at the Early Career Social, we can greet other members and meet new mentors. And we encourage contact with mentors/

Nominate a colleague for the Early Career Award in Reclamation. The award recognizes an early career member of ASMR in reclamation research, teaching, and/or on the ground reclamation (either with industry, regulatory agency, or reclamation contractor). The nominee must have been employed in their field for a minimum of three (3) years but not more than ten (10) years. Nominations are due mid-January, so start thinking now who would be a good colleague to nominate. For more information on the nomination process see the ASMR website.

mentees throughout the year. If you need help finding a mentor, please contact me and I can try and put you in touch with a mentor. My email is cindya@sgm-inc.com

Be involved with an ASMR Technical Division. There are seven technical divisions at ASMR: Ecology, Forestry/Wildlife, Geotechnical Engineering, International Tailings, Land Use Planning and Design, Soil Overburden, and Water Management. Each technical division has opportunities to participate throughout the year as well as at the annual meeting. ASMR members are welcome to participate in any technical division. Think about presenting your research or a key project at the next ASMR meeting, these presentations are a great way to share ideas with other reclamationists.

Some roles of the technical divisions are to review papers and abstracts, assist in selecting moderators for annual meetings, and assist the ASMR leadership in developing subject areas for future conferences. Technical divisions also provide a forum for discussion and exchange of information. Information on how to contact the technical division head is on the ASMR website.

Contribute articles to Reclamation Matters or JASMR. ASMR is always looking for new research and interesting articles for either of these publications. These are both great ways to publish your research no matter the size of the project. ■

Wild Women of Reclamation

By Michele Coleman

The fourth gathering of Wild Women of Reclamation (WWR) occurred in Spokane, Washington at the 2016 ASMR Conference on June 8, 2016. Women in all stages of their careers gathered to have breakfast, enjoy presentations by Jane Thomas and Dr. Zenah Orndorff, network, create mentoring opportunities, discuss experiences and most importantly, share some laughs. The goal of the gathering is comradery and to have a discussion of common experiences, unique as women, in the pursuit of better reclamation. This affiliation is also another tool we can use to empower women to have confidence in our abilities to advance in our careers, mentor the future generation of professionals, and to improve the lives of everyone through our interactions.

This year's speakers were selected from not only two different career paths, but also two different generations. The presentations were inspiring because of the true grit that Jane Thomas demonstrated throughout her career to succeed, and the diverse home and work balancing strategy needed for success by Zenah Orndorff. Both women spoke with passion about their careers, but their career paths were altered by periodic personal choices, which changed their circumstances.

Jane Thomas is an analytical chemist who started working at the Illinois State Geological Survey. Quickly realizing that not having an advanced degree was going to be a barrier, she attended graduate school to get a Master's Degree in analytical chemistry at the University of Wyoming. Jane talked about the balancing act of being a single parent while in graduate school and the hard choices she made. Shortly after, she also realized that being a woman was going to be another barrier, so she started her own company, Wyoming Analytical Laboratories, Inc., in 1977 in Laramie, Wyoming. The short story is that the company has grown to now have 20 employees distributed across laboratories in Laramie, Golden, Colorado and Rock Springs, Wyoming. Jane remains as the President of Wyoming Analytical Laboratories, Inc. (WAL) and proudly lists it as a "woman-owned" company that provides "multi-service, multi-location analytical laboratory servicing for a wide variety of customers in the environmental, energy, semi-conductor, petroleum, water and wastewater fields." She demonstrated her passion by speaking for 20 minutes, without notes or PowerPoint, to an engrossed audience. She then confided that public speaking was not something that came

Front row, left to right: Hannah Patton, Lydia Mignogna, Leah Oxenford, Margaret Dunn, Alexis Monteleone, Megan Wolfe, Michelle Cliff, Melissa Van Scoyoc, Callie Driessen, Angie Sherman, Sara Klopf, Jenwei Tsai, Michele Coleman and Kelsea Palmer

Back row, left to right: Ashley Rovder, Betty Brandle, Jennifer Leinart, Staci Wolfe, Hannah Angel, Kara Dallaire, Mindy Wheeler, Maggie Eshleman, Zenah Orndorff, Brenda Schladweiler, Cindy Adams, Jane Thomas, Kristina Minchow, Katie Bills Walsh, Keri Anne Prichett, Krista Noyes

easily to her but she has worked hard at it because being a business leader means you must have excellent communication skills. It was obvious that Jane looked at career barriers as things to confront and overcome, not to be frightened or shy from. I, for one, who has known Jane for years, was stunned by her demonstration of tenacity throughout her career. Jane was truly one who helped to pave the path for many of us that followed in this industry.

Dr. Zenah Orndorff is a Senior Research Associate with the Department of Crop and Soil Environmental Sciences at Virginia Tech University. Zenah had a fun photo timeline that talked about the choices she had to make while building a career, raising a family, caring for elderly parents, carving out time for a side business in pottery, and training and nurturing new recruits for the caving community in the Blacksburg, Virginia area. She has expanded her volunteer role in the community by recently being one of the initiators of a locally based caving rescue organization. For Zenah, her work is very important to her, but she is willing to make career choices to accommodate her work/life balance needs.

During the discussion that followed, there were many questions about how those work/home/life decisions were made. There was an obvious difference in the work attitude toward women between Jane's early career in the late 1970s and Zenah's two decades later. Some of the barriers had been lessened and women in science were now more accepted. Based on several humorous anecdotal stories presented by the audience, it was obvious, though, that barriers still exist, and so we must continue to work at making it more acceptable everywhere for women to be able to pursue their career passions.

Again, to keep the networking going throughout the coming year, the group was divided into "more experienced" individuals (i.e. approximately greater than five years in their career) versus "less experienced" (i.e. less than five years). A person from one group was paired with a person from the other group. Those mentors and "mentorees" were then given the assignment to keep in touch with each other throughout the coming year. This mentoring is a great way to form friendships and learn about reclamation work being conducted in different parts of the U.S. and the world.

Wild Women of Reclamation was initiated by Dr. Brenda Schladweiler in 2013 as a tool to provide mentorship and professional support for women in reclamation. WWR is open to any female who works in the field of reclamation, whether a practitioner, academic, consultant, service provider, in the natural resource industry or other. There are no fees, no forms and no formalities to join. Current co-chairs are Michele Coleman and Cindy Adams. We can be reached at:

- Michele Coleman – mcoleman@nbpower.com
- Cindy Adams – cindya@sgm-inc.com

So, fellow Wild Women of Reclamation, please join the WWR LinkedIn account by contacting Cindy and continue to share your stories of "worst days at work" and "lovely wildflowers." If you have suggestions about improving networking and communications, please don't hesitate to contact either Michele or Cindy directly. We look forward to seeing many of you and any new invitees in West Virginia in 2017! ■

Message from the Outgoing President

By Brenda Schladweiler

For this past year as your president, I'd like to thank Robert Darmody for his hard work as executive secretary and helping to prepare for the annual meetings. I'd also like to thank members of the National Executive Council or NEC, both current and those just going off the NEC. Much has been accomplished this year as we continued to work to improve the business side of ASMR, as well as communications amongst all. Since this is my last time to address you as president, I want to share some thoughts I've gathered, so pardon me while I get a little nostalgic.

On Saturday, my day started out in Gillette, Wyoming, which is essentially the transition between Northern Plains and Sagebrush Steppe. Landing in Denver, the lush green growth of the Shortgrass Prairie was evident due to a number of precipitation events that hit the Central Rockies in late spring. I slept through the rise over the mountains in Colorado and woke up to High Desert country probably somewhere on the West Slope. Desert transitioned to snow-capped peaks and high elevation mountains, including a flyover of Yellowstone where the mineral pool areas were evident, even at 30,000 feet. Green valleys and snow-capped mountain ranges continued over Western Montana to the forests and valleys of Idaho before landing in the forest and farm ground of eastern Washington. This reminded me of the variety of landscapes in which we work as reclamationists. Some things are similar but many are not. Mother Nature provides us with a number of challenges and ultimately has the last word on so many of them.

I also saw out my airplane window the different types of "disturbances" associated with those landscapes. I could see what appeared to be mining, but there was also large-scale fire scars, logging, as well as roads and towns of varying sizes. What always jumps out at me are the housing developments that encroach on lakes and forests, as well as the roads to those homes. We live in a modern age where disturbance is part of the landscape….whether it is human caused or Mother Nature.

While coming into Spokane, I thought of our society – the American Society for Mining and Reclamation. We as a society, more than any other, are poised to assist in the reclamation, mitigation, remediation, restoration (or whatever word you choose) of that land. Our practitioners are spread throughout this country and understand the flip side of that economic coin: the need to derive commodities for beneficial use, as well as the reclamation of the impact for that use. Just as Americans must recognize that dichotomy, we as a technical society must recognize both sides of that coin as well. We cannot have our cake and eat it too.

I first learned the need for "conservation" from my tight ol' German parents… who knew the value of working hard, being smart with what you have and never wasting anything. They grew up in the "dirty '30s" and knew that nothing was guaranteed. I'm sure you too can think of parents or grandparents who had those same beliefs. We, as a modern people, have the knowledge but often do not have the will (based on lack of necessity) to do the same thing they had to do. Today, it's often the trendy thing to do while, back then, they had no choice.

As Americans, we live in a polarized nation on many issues including those concerning energy and commodity production. Divided opinions, however, does not necessarily lead to problem solving, at least not in an effective manner. If the two sides are not willing to educate each other, see the other perspective, collaborate and provide meaningful solutions, we may be doomed to live out our years as we see it played out in the media. Again, ASMR, I believe, is unique in that respect. We see the need to provide those goods and services while at the same time minimizing those impacts and providing real solutions.

While never forgetting our deep-seeded roots in SMCRA, we need to envision as a technical society educating the general population on all forms of disturbance. As individuals, we need to have that same vision. While attendance in many professional societies is declining, we need to find that proper balance between the institutional knowledge of the living legends and the enthusiasm of the young professionals.

Our challenges in achieving or maintaining worth from this society to all professionals is great.

I encourage you to take the initiative in your own town and city, in your own state, and at a national level, if possible, to tell your story wherever you can. Speak out in the local newspaper or radio station. Talk to friends and relatives in areas of the country that do not comprehend where their goods and materials even come from. In many ways, we are our own best kept secret...however, modesty will not help the nation.

My goal would be that every citizen in my state, Wyoming, understands the meaning of the word "reclamation." Decisions through ignorance are not acceptable. We can all be on a continuum of opinion but decisions need to be made based on the full knowledge of any given issue. Thank you for allowing me to be your president this year and to continue to move ASMR forward. Have fun this week. ■

A Glance at ROaR!

By Morgan Squires, Michael Curran and Zoe Sherman

Through dedication, community support and teamwork, the University of Wyoming Reclamation Outreach and Research (ROaR!) Club is striving to promote the importance of reclamation and restoration practices through encouraging research and community service. Since ROaR!'s last published Reclamation Matters article in 2014 and the efforts of former ROaR! President Jay Quintanilla and advisor Dr. Peter Stahl, director of the Wyoming Reclamation and Restoration Center and newly elected President of ASMR, the club has continued to grow and accomplish its mission.

Research

With support from the University of Wyoming Biodiversity Institute, the club was able to purchase native seed for use in converting an agriculture building courtyard from a pigeon wasteland to a native species-influenced ecological area. Hazmat suits were used in the pigeon-dropping cleanup and student manual labor was committed to removing cemented weeds to prepare for the site for the seeding of native plants. Students involved in plant identification courses will be encouraged to utilize this area for fulfilling the dichotomous key component of their courses. This area will also be monitored in the future years to analyze the competitive nature of local species.

Outreach

As the Wyoming Spring settled in, the club participated in their third annual Spring Creek cleanup. Despite the severe wind and occasional icy rain, more than a truckload of trash was removed from the area. The club will also return to locations alongside the Laramie River bank to reevaluate the success of assistance provided to the Laramie River Conservation District and City of Laramie in combating stream bank erosion.

As a recognized student organization of the Associated Students' Union of Wyoming, ROaR! has worked closely with the university and the Wyoming Reclamation and Restoration Center to raise funds to host nationally prominent speakers. These speakers included Dr. Doug Tallamy (University of Delaware and author of Bringing Nature Home: How You Can Sustain Wildlife with Native Plants), Dr. Doug Landis (Michigan State University), Dr. Annette Giesecke (University of Delaware), and Emma Marris (author of Rambunctious Garden: Saving Nature in a Post-Wild World). The club hosts speakers each year to provide members and interested students with an educational experience beyond the typical classroom lecture.

Reclamation

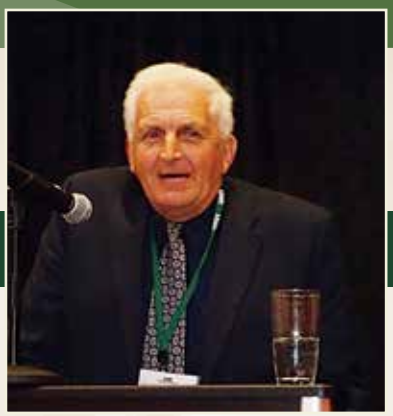
ROaR! has partnered with Union Pacific, CH2M Hill, Western Regional Climate Center, and the UW Biodiversity Institute in creating a pollinator habitat within a Creosote reclamation area near the Laramie River. It will feature over 26 native wildflowers and a park bench facing the garden. Planting is being done not only to enhance aesthetic beauty, but also to design the landscape for ROaR! students to conduct basic research related to pollinators and plant-insect interaction.

A Look Ahead

As ROaR! Club members transition into another academic year, the current economic, environmental, and legislative events show signs that significant changes are on the horizon. The newly elected officer team of President Morgan Squires, Vice-President Zoe Sherman, Secretary Tyler Scherden, and Treasurer Joel Christensen are brainstorming to develop projects to prove that community improvements can be achieved, one site at a time. ■

PIONEER OF RECLAMATION

Dr. Peter Beckett



Peter Beckett has been involved in numerous areas of land reclamation for over 40 years. He received his Ph.D. in wetland ecology from King's College, London, England. He is a professor in the Department of Biology at Laurentian University in Sudbury, Ontario, Canada. His understanding of land, water and ecology is highlighted by his career in the "Greening of Sudbury." His leadership in this project has led to the successful restoration of this degraded landscape.

Dr. Beckett is an internationally recognized expert and has worked in Canada, Russia, Germany, Hong Kong, Turkey, Glasgow and the United States. He has served as President and Director of the Canadian Land Reclamation Association, a member of the National Executive Committee of the American Society of Mining and Reclamation, judge of the student presentations at the American Society of Mining and Reclamation conference since 1999, and a technical reviewer for numerous journals. He has served as co-chair of the Sudbury Mining and the Environment International Conference in 2003, 2007, 2011 and 2015. He has been recognized for his research, teaching and restoration efforts with the Community Builder Award, the Sudbury East Board of Trade Citizen Award, and the Noranda-Canada Land Reclamation Association for outstanding contributions. Due to Peter's research efforts, Laurentian University received the Dr. Edward M. Walker Award from the Canadian Land Reclamation Association.

Peter was nominated by Michele Coleman, who stated that "Many people do reclamation. Many people do research in reclamation. Many people engage community groups and citizens to educate about reclamation. Dr. Peter Beckett has excelled in all of these areas."

Congratulations to Peter Beckett for being a Pioneer of Reclamation.

RECLAMATIONIST OF THE YEAR AWARD

James E. Truax

Jim has been involved in land reclamation, restoration and conservation for the past 42 years. He has been the owner of Truax Company, Inc. since 1974. He started his working career in the landscape business and in seeding native species in Minnesota and other Midwestern States.

Jim is a mentor of students and young people and established a foundation/scholarship fund for college students. He invented and continues to improve on several models of the Truax seeding drill to address specific needs of users. His drills have addressed the need to handle seeds with properties that make them difficult to seed with conventional drills. In addition, his drills address soil and landscape problems encountered in mined land rangeland revegetation. He has also developed drills to address no-till crop production challenges.

Jim is known for his oft-stated mantra that the key to successful plant establishment is "seed placement, seed placement, seed placement." Jim is a very generous and caring person who supports students, professional societies, and civic groups throughout the U.S. He has been an exhibitor at the ASMR meetings for decades and works closely with the mineral industry to aid in their successful reclamation of mined lands. Because of this dedication to conservation of our natural resources, Jim has been recognized and received awards from the Minnesota Chapter of Soil and Water Conservation Society, and the Distinguished Service Award and Outstanding Achievement Award from the Society for Range Management. He has also been recognized by the Great Basin Native Plant Selection and Increase Project and received the Degree of Chevalier by Demolay for his service to them over the past several decades.

It is with great pleasure and personal pride that the Society confer the 2016 Reclamationist of the Year Award on James Truax. He is a great supporter of the Society and the field of land reclamation. He was nominated by Brenda Schladweiler.

RICHARD I. AND LELA M. BARNHISEL RECLAMATION RESEARCHER OF THE YEAR AWARD

Louis M. McDonald

Dr. McDonald received his B.S. from California Polytechnic State University, his M.S. from Louisiana State University, and his Ph.D. from the University of Kentucky. He has been Professor of Environmental Soil Chemistry at West Virginia University since 1997. He has conducted an extensive research program in the areas of ion exchange properties of soils and solutions, acid mine drainage, water quality from underground and surface mines, mine soil amendments, and organic carbon transformations in soils. Dr. McDonald has been an important contributor to studies on acid mine drainage in West Virginia that dealt with the longevity of acid mine drainage from above-drainage underground mines, acid-base accounting for predicting acid mine drainage, flocculation properties resulting from AMD chemical treatment, and the release of total dissolved solids from overburden materials.

Dr. McDonald has hosted nine scientists from France, Iran, Korea, China, India, and the United States. He has served as faculty advisor to 11 graduate students and has served on the committee of 22 graduate students. He also teaches four courses at the University: Soil Fertility, Soil Chemistry, Laboratory Chemical Methods, and Spectroscopic Analytical Methods. His teaching and research accomplishments have been recognized with the Outstanding Advisor Award, Outstanding Teaching Award, Outstanding Research Award, and both the Junior and Senior Faculty Award from the College of Agriculture, Natural Resources and Design. He is an active member of ASMR and serves as an associate editor for the JASMR and is serving as co-chair of the 2017 National ASMR Meeting in Morgantown, West Virginia.

It is with great pleasure that ASMR's 2016 Richard I. and Lela M. Barnhisel Reclamation Researcher of the Year Award goes to Dr. Louis M. McDonald. Dr. McDonald was nominated by Jeff Skousen.

WILLIAM T. PLASS AWARD – LIFETIME ACHIEVEMENT

Carl E. Zipper

This award is given to a person who has distinguished themselves in the field of mined land reclamation at the local, regional, national, and international levels. The award is the highest honor the Society has and recognizes those in teaching, research, outreach and administration.

Carl Zipper received his B.S., M.S., and Ph.D. from Virginia Tech. Carl has been involved in mine land reclamation for 35 years as a teacher, leader, administrator, and researcher. Dr. Zipper's outreach efforts have centered in his leadership of the Powell River Project – where he currently serves as the Director – which serves many faculty at Virginia Tech. His leadership has been crucial to the long-term continuity and contributions of the research program there, which has provided funding for numerous staff and faculty of the University. He also supervises the Powell River Project Research and Education Center, a 1,100-acre facility that hosts outreach programs for industry, agencies, and other interested parties, and serves as a site for long-term research.

Carl has also had an active and productive research program in the area of acid mine drainage and the reforestation of active and abandoned mined lands. He has authored/coauthored 375 professional publications including abstracts, peer-reviewed papers and extension/outreach publications. At the intentional level, Dr. Zipper has worked closely with the China University of Mining and Technology and has served as a member of the International Energy Agency's Coal Industry Advisory Board. Dr. Zipper's research and outreach have had major impacts on mined land reforestation, acid mine drainage remediation, total dissolved solids characterization and mitigation. His teaching, research and outreach efforts have been recognized by numerous groups including the Prazen Living Legend of Mining Award (PRP), Award of Excellence in Mine Reclamation, Virginia Dept of Mines, Reclamation Researcher of the Year (ASMR), and Alumni Award for Excellence in University Outreach (VT).

It is with great honor and pleasure that the Society awards Carl Zipper with the William T. Plass Award. Dr. Zipper was nominated by James Burger.

Early Career Award in Reclamation

Melissa Van Scoyoc

This award category was approved in 2014 to recognize our younger early career members.

Melissa received her B.S. degree in Land Rehabilitation Science from Montana State University in 2009. After graduation, she worked with the BLM in Wyoming, Montana, North Dakota, South Dakota and Idaho, and also The Nature Conservancy.

She was recognized by the BLM with numerous awards, such as the Superior Performance (three times), Star Award (twice), the Erskine Excellence in Agriculture Award, and Land Resources Stewardship Award from Montana State University. This experience enabled her to return to her home state of California and join the Salmon River Restoration Council in 2015, where she currently coordinates the Habitat Restoration and Noxious Weed program. She is responsible for coordinating the development of a comprehensive effort to restore floodplain and mine tailings on the Salmon River.

It is an honor to present the 2016 ASMR Early Career Award in Reclamation to Melissa Van Scoyoc. We look forward to her leadership in the field of reclamation and the society in the future. Melissa was nominated by Cally Driessen.

American Society of Mining and Reclamation Awards Program

The awards program of the American Society of Mining and Reclamation is our premiere program that honors and recognizes members of our society for their outstanding and exemplary efforts in mined land reclamation fields of research, teaching, outreach, and long-term accomplishments in this area.

Our awards committee is composed of representatives of the mining industry, academia, and government agencies (regulatory and research). Normally one award is given per year for the three major awards: Plass, Researcher, Reclamationist, and Early Career. But more than one award can be given to Pioneers in Reclamation. Please give serious consideration to nominating one of the many worthy members for these awards for 2017. Information on award criteria and submission is on the ASMR web site (http://www.asmr.us/) and the nomination procedure is quite simple. Remember that the nominator and the successful recipient of the five main awards receive complimentary registration for the annual conference.

Because the 2017 conference is April 9-13, 2017, the deadline for award nominations will be November 4, 2016 to give the awards committee time to evaluate the nominations and also give our Executive Secretary time to get the plaques ordered and certificates prepared. So now is the time to start preparing your nominations. We are hoping for a record year of nominations.

Student Awards

Scholarship B.S.
Hannah Patton
Saint Francis University

Scholarship M.S.
Amy P. Jacobs
University of Wyoming

Scholarship Ph.D.
Mariam K. Al-Lami
Missouri University of Science and Technology

Oral Presentation 1st
Miriam Al-Lami
Missouri University of Science and Technology

Oral Presentation 2nd
Scott Robinson
Montana State University

Oral Presentation 3rd
Bart Caterino
West Virginia University

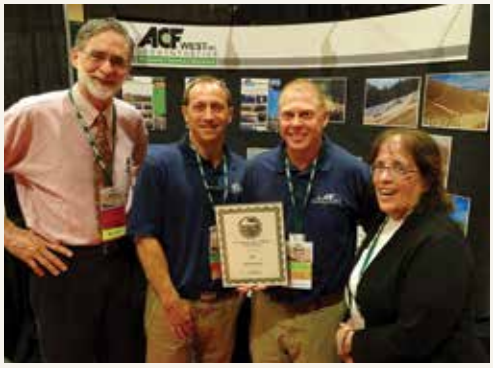
Oral Presentation 1st Undergrad
Madelyn Williams
Brigham Young University

Oral Presentation 2nd Undergrad
Undergrad Group
St Francis University

Poster Presentation 1st
Amy Jacobs
University of Wyoming

Poster Presentation 2nd
Nicholas Shepherd
University of Oklahoma

Exhibitors



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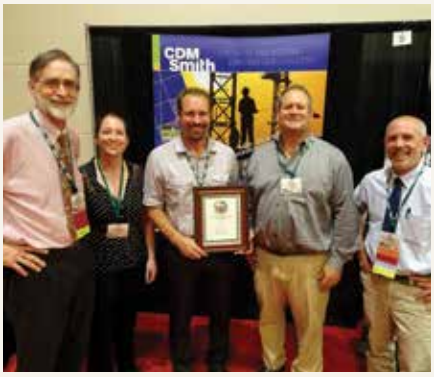

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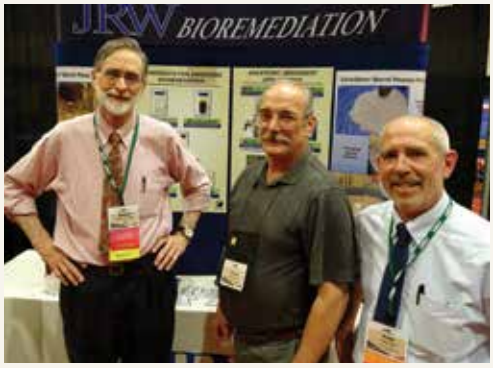

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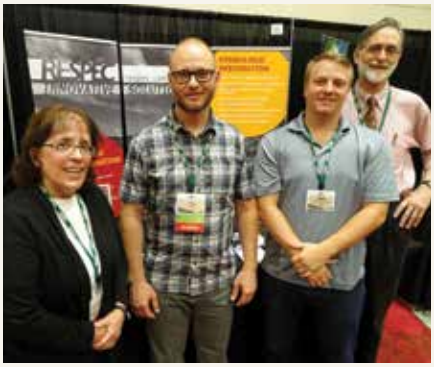

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CALL FOR ABSTRACTS

Submit by November 30, 2016

JOINT CONFERENCE OF THE

- **West Virginia Mine Drainage Task Force Symposium**
- **American Society for Mining and Reclamation (ASMR)**
- **Appalachian Regional Reforestation Initiative (ARRI)**

Conference Papers

We invite researchers, practitioners, regulators, industry, consulting firms, and others to present research findings, case studies, demonstration projects, and regulatory/policy studies on any of the following subjects.

Acid Mine Drainage
AMD Active Treatment
Reforestation
Post-mining Land Use
Overburden and Soils
Hydrology
Reclamation Policy
Wildlife and Habitat
Cultural Surveys and Design
Refuse and Tailings
Reclamation Success
Prevention Techniques
AMD Passive Treatment
Revegetation
Abandoned Mine Lands
Stream Restoration
Water Management
Regulations
Urban Reclamation
Geotechnical Stability
Land Use Planning
New Developments

Please submit an abstract **electronically** for an oral or poster presentation by **November 30, 2016** to Robert Darmody (rdarmody@illinois.edu). Abstracts will be reviewed and placed in a technical session. Written papers may also be submitted to the Journal of the American Society of Mining and Reclamation. An abstract submission form is available at www.wvmdtaskforce.com. All PowerPoint presentations will be loaded on a conference web site.

Registration

Early registration is from January 1st to February 28th 2017 at www.wvmdtaskforce.com. Expected registration fee is $400; late registration will be $500.

Conference Site

The Waterfront Hotel is the conference center and hotel. The hotel features 206 deluxe guest rooms. A block of rooms has been reserved at a rate of $109 per night, please mention that you are with the Task Force.
The phone number is 304-296-1700.
www.waterfrontplacehotel.com

Transportation

Morgantown, West Virginia, is located about 80 miles south of Pittsburgh, PA. Travelers can fly to Pittsburgh, PA, rent a car and drive via I-79 to Morgantown, or take a shuttle flight to Morgantown www.tourmorgantown.com. We are contracting a limo service for Sunday and Thur/Fri.

Sponsors

This conference and exhibition will be one of the largest mining, reclamation, and mine drainage meetings in the USA in 2017. We expect an audience of between 400 and 500 people, over 120 presentations to be made, and over 40 exhibitors to show their products. We have five levels of support and the money can be used for: 1) general support, or 2) a specific event or function.
Gold Sponsor - $10,000 (Option to sponsor: Plated Luncheon)
Silver Sponsor - $5,000 (Luncheon or Reception)
Bronze Sponsor - $2,500 (Breakfast, Breaks, or Field Trip)
Coal Sponsor - $1,000 (General expenses)
Raffle and Silent Auction Items for Scholarships - **$100 to $200**

Exhibits

We invite your participation in presenting an exhibit. Exhibitors will be provided an 8-foot table area and electricity. To reserve an exhibit space, please contact Tiff Hilton at 304-645-7633 (email wopec@suddenlink.net). An exhibit space costs $1,000 and includes a basic registration.

Workshops (Sunday, April 9, 2017)

#1: Watershed Restoration with Passive Treatment

Margaret Dunn, SRI bmi@biomost.com, 1 - 4 pm, $50.
This workshop will discuss AMD treatment systems, and roles of a watershed organization.

#2: Using AMDTreat to Evaluate Mine Drainage Treatment

Brent Means, bmeans@osmre.gov, 9 am - 4 pm, $50.
AMDTreat software will be used to evaluate AMD treatment methods and economics. Participants should bring a computer

WHAT'S NEXT FOR RECLAMATION?

APRIL 9-13 2017

MORGANTOWN, WV • WATERFRONT HOTEL

#3: Android and IOS based Geodatabase Collection for Mines

Nick Schaer, Nick.A.Schaer@wv.gov, 9 am – 12 noon, $50.

An overview of emerging mobile applications for GIS and GPS, and demonstrations of how they can be used in reclamation field work.

#4: Water Treatment Solutions for Mining

Veolia Water, jill.browning@veolia.com, 9 am - 4 pm, $100.

An overview of water chemistry will be done, and water treatment systems including clarification, TDS management, treatment of sulfate and other anions, and metal removal will be discussed.

#5: Natural Process for Restoration of Drastically Disturbed Sites

Dave Polster, d.polster@telus.net, 9 am - 4 pm, $150.

This workshop will explore natural processes, systems and functions and how they can be used to restore disturbed sites through soil and water rehabilitation and nutrient and vegetation cycling.

Field Trips (Tuesday, April 11, 2017)

#1: Surface Mining and Post-mining Land Use

Randy Maggard, MEPCO, 1 - 5 pm.

A small 100-ac surface mine outside of Morgantown will be visited along with a hydrated lime treatment plant. The tour will see a 25-yr-old reclaimed area with various post-mining land uses.

#2: Acid Mine Drainage Chemical Treatment Plants

Mike Sheehan and Paul Ziemkiewicz, WVDEP and WVU, 1 – 5 pm.

West Virginia Dept Environmental Protection operates several AMD treatment systems in the Cheat River Watershed. Several systems will be visited and discussed with water analyses and costs.

#3: Passive Treatment of AMD in Cheat River Watershed

Margaret Dunn and Tim Danehy, SRI, 1 - 5 pm.

Several nearby passive systems will be visited including a flushable limestone pond, vertical flow wetland, anaerobic wetlands, open limestone channels, and anoxic limestone drains.

#4: ARRI Reforestation of Mined Lands – Flight 93 Site

Scott Eggerud and Brad Edwards, OSMRE, 8 am - 4 pm, $50.

The Flight 93 Memorial Site with its new museum will be visited. Thousands of trees have been planted using the FRA here and participants will see how legacy mines can be prepared for tree planting and observe the tree's survival and growth.

#5: Longview Power Plant, Morgantown, WV

Randy Maggard, MEPCO, 1 - 4 pm.

The 600-MW coal-fired power plant uses a super-critical boiler and modern pollution-capture technologies to add power to the grid. This is one of the cleanest burning power plants in the US.

#6: Marcellus Shale Well Pad Site, Morgantown, WV

Tim Carr, WVU, 1 - 4 pm.

A Marcellus Shale well pad near Morgantown was established near Morgantown and 1-mile deep vertical wells were installed and fracked to withdraw natural gas.

Contact: Jeff Skousen, Conference Chairman at 304-293-2667, email jskousen@wvu.edu. Online registration at https://wvmdtaskforce.com/

Important Dates to Remember:

Abstract Deadline.....November 30, 2016
Pre-registration Begins.....January 1, 2017
Late-registration Begins.....March 1, 2017
Exhibitor Signup Deadline.....March 1, 2017
Meeting Dates..... April 9-13, 2017

The Spenceville Mine Closure

By William J. Walker

FIGURE 1.
The Spenceville Mine site in the late 1800s.

FIGURE 2. *The Spenceville Mine and pit lake contains pH 2 water. The red piles in the background are the iron oxide tailings.*

The Spenceville Mine site is located within the California Department of Fish and Game's (DFG) Spenceville Wildlife Refuge in the foothills of the Sierra Nevada Mountain range, about 20 miles southwest of Grass Valley and 30 miles northeast of Sacramento, CA. The mine opened in 1863 as the Well Lode Copper Mine and closed shortly after the Civil War. In 1877, the Grass Valley Copper Mines that butted up to the western margin of the San Francisco Mining Company's claim were purchased and became the San Francisco Copper Mine and Reduction Works. In August of 1880, a head frame toppled into a vertical shaft which caused the ore to be extracted by open pit techniques. From 1888 through 1897, the Imperial Paint Company and Copper Works leached the tailings for copper and used the waste iron-rich tailings as a pigment in the manufacture of red paint (Figure 1).

The Spenceville Mine site area encompasses approximately 10 acres bounded on the east and south by Little Dry Creek and Dry Creek, respectively. The mine site is located at altitudes ranging from 300 to 500 feet. In the central portion of the mine site, a pit lake created by groundwater inflow into the mine pit after mining ceased (Figure 2). The pit lake contained approximately 6 million gallons of acidic water (pH ~ 2.5).

A Mine Site Characterization/Closure Plan and an Initial Study/Mitigated Negative Declaration were prepared and submitted for approval by the State of California Regional Water Quality Control Board-Central Region, the lead regulatory agency for this project.

Mine Closure Plan

Initial reclamation activities included securing the site perimeter with fencing, installing temporary erosion and sediment controls such as silt fences and limestone berms, construction of access roads, and site grading for laydown areas and treatment plant facilities. The reclamation plan included the following elements:

- Characterizing the soil and water for physical and chemical properties,
- Dewatering the pit and treating the water in a lime neutralization plant,
- Removing and treating the mine rock and waste piles with a liming agent and filling the pit with the treated waste,
- Re-contouring the site,
- Revegetating the site,
- Re-aligning Little Dry Creek,
- Completing archaeological studies, and
- Monitoring surface water, groundwater and vegetation.

Characterization Work

At least one year was spent conducting various characterization studies. These included:

- The tailings and mine waste volumes were estimated from numerous test pits determining the depth to unaltered rock.
- Pit fracture analysis was conducted to understand rock orientation, competence and stability required for entering and backfilling the pit.
- Samples of waste rock, tailings, overburden, and pit lake sediments were analyzed for chemistry, mineralogy and lime requirements.
- The pit lake filling was modeled with a groundwater flow model.
- Archaeological studies were conducted to save and document historical artifacts.
- Water treatment was tested in several pilot studies to reduce cost and improve efficiency.
- Ecological studies were conducted to determine the overall

biological health of the stream and tributaries.

- Vegetation studies were conducted to determine soil types and chemistry and then the nutrient requirements required to re-establish native species.

Much of this work was documented in a 2001 study submitted to California Department of Fish and Game.

FIGURE 3. *The tailings and mine waste volumes were estimated from numerous test pits determining the depth to unaltered rock. Here, tailings cuts reveal the presence of banded sulfur deposits.*

FIGURE 4. *Pit fracture analysis was conducted to understand rock orientation, competence and stability required for entering and backfilling the pit.*

Water Treatment

The purpose of the water treatment plant at the Spenceville Mine was to treat the approximately 6 million gallons of acid mine drainage accumulated in the mine pit lake so that the pit could be reclaimed. Treated water from the plant was discharged to a nearby land area in a safe, passive application process that resulted in minimal impact to the area's soils and vegetation.

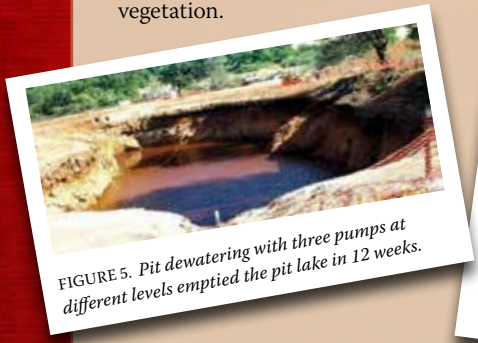

FIGURE 5. *Pit dewatering with three pumps at different levels emptied the pit lake in 12 weeks.*

FIGURE 6. *A conventional lime treatment plant was used to raise the pH of the pit lake water to neutral and remove metals.*

- Pit bottom sediments: mainly hematite mine waste that eroded from the hematite deposits and was transported into the pit by storm runoff.

Initial access into the dewatered pit was via an excavated ramp on the east rim of the pit. The ramp was excavated about half way down to the pit bottom, at which point a temporary fill of lime treated mine waste and excavation rubble was placed from the bottom of the excavation to the floor of the pit. Prior to beginning excavation of the pit bottom sediments, a large crane with a clamshell bucket was mobilized to remove several vehicles and other debris that were found at the bottom of the pit. After removal of the debris, excavation and treatment of pit bottom sediments began. While excavating the pit bottom sediments, the depth to a hard rock bottom was found to be significantly deeper than originally anticipated. Several test pits were dug into the pit sediments to determine the characteristics and estimate the depth of material in the bottom of the pit. Each test pit exposed a layer of hematite mine waste and/or fill material used for construction of the pit ramp, overlying a deposit of non-reactive metavolcanic rubble of undetermined depth. To address the unanticipated thick deposit of rubble on the pit floor, the pit bottom sediments were removed and the upper two feet of coarse rubble material were replaced with a two-foot-thick layer of compacted crushed limestone. The crushed limestone layer provided a base for placing the treated mine waste, and provided buffering for potential migration of acidic water into the pit..

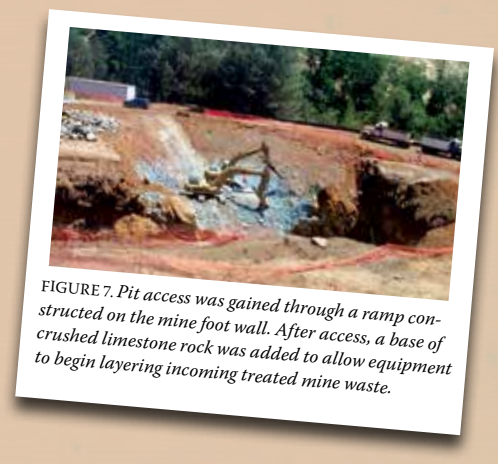

FIGURE 7. *Pit access was gained through a ramp constructed on the mine foot wall. After access, a base of crushed limestone rock was added to allow equipment to begin layering incoming treated mine waste.*

Mine Waste Excavation, Treatment, and Placement

Approximately 70,000 cubic yards of mine waste were excavated. Mine waste and mine-impacted materials at the site included the following:

- Hematite tailings: red-purple-black roasted ore material.
- Jarosite piles: piles of yellowish mine overburden material.
- Disturbed native materials: the areas mapped as containing "disturbed native materials" included three benches (flat areas) where various mine facilities were once located and the area to the east and south of the mine pit.

After treatment of the pit bottom sediments, placement of treated mine waste began. A conveyor system was set up for conveying the mine waste and lime into the pit. The conveyor system consisted of two sets of traps, motors and conveyors, one for the mine waste and the other for the lime. The two conveyors discharged onto a main conveyor, which transported the mixed mine waste and lime into the pit. A water spray nozzle was located at the end of the main conveyor to minimize dust generation as the material dropped into the pit. The speed of each conveyor was calibrated to obtain the proper lime dosage for each material. The lime and mine waste were further mixed at the bottom of the pit by dozers. The dozers spread the treated mine waste in eight-inch to one-foot lifts, and each lift was compacted with a sheepsfoot roller.

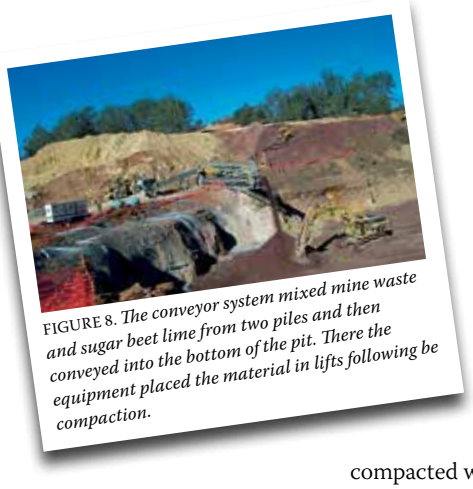

FIGURE 8. *The conveyor system mixed mine waste and sugar beet lime from two piles and then conveyed into the bottom of the pit. There the equipment placed the material in lifts following be compaction.*

Treated mine waste was compacted to 95 percent of the maximum dry density as determined by ASTM D698. Once the elevation of the treated mine waste in the pit approached the elevation of the pit rim, the conveyor system was removed and the mine waste and lime were placed, mixed and spread in the pit with dump trucks and dozers. Since the volume of material placed in the pit exceeded the capacity of the pit, a mound of treated mine waste was constructed over the pit. After all the treated mine waste was placed, the side slopes were covered with riprap for protection from flooding.

FIGURE 9. *The pit is nearly completed in this picture. The oxide tailings (red/purple material in foreground) are being treated and added via the conveyor to the right.*

FIGURE 10. *The mine pit is filled and contouring of the site begins.*

After the mine waste was excavated, and prior to placement of soil cover, the slopes of the excavated surfaces were regraded. The slopes were graded to three horizontal to one vertical (3H:1V) or flatter to reduce erosion, facilitate revegetation, and smoothly merge the topography of the regraded site with the adjacent land. In steep areas, or areas which had an abrupt change in topography, clean fill from a mixture of 60 percent limestone and 40 percent fresh bentonite (by volume) was to stabilize the adits and shaft. The purpose of the bentonite was to minimize seepage of potentially acid water into the pit, while the purpose of the limestone was to buffer any seepage that did move into the pit.

The limestone/bentonite material was placed into each adit as deep as possible with an excavator bucket. The shaft was filled with quarry rock to about 20 feet below the rim of the shaft. The remainder of the shaft was filled with the 60/40 mix of limestone and bentonite. After remediation, the adits and shaft were buried with placement of the treated mine waste in the pit.

After placement of two feet of topsoil over the site, the cover soil was amended with 134 cubic yards per acre of compost and 100 pounds per acre of fertilizer. After amendment with fertilizer and compost, a wood chip mulch layer was placed over the cover soil to control erosion, help prevent the establishment of weed species and conserve soil moisture.

FIGURE 11. *At least six different shafts and adits were identified and some had runs as long as 50 feet.*

Stream Restoration

Little Dry Creek received run-off leachate from the waste piles and overflow of water from the mine pit, resulting in significant loading of metals and acidic water to the stream. Although the affected area appeared to be mainly restricted to the section of Little Dry Creek adjacent to the mine site, both these factors decreased the suitability of the creek as habitat for aquatic receptors. In addition, Little Dry Creek near the mine site had a hard-bottom substrate of cemented rocks, very little overlying sediment, virtually no submerged aquatic vegetation, and very shallow water in most places. This combination of features contributed to the creek offering poor quality habitat for aquatic species.

Based on a review of pre-mining site photos and a survey of the existing creek bed area, it was determined that the original pre-mining stream channel was east of the existing channel. Stream restoration thus included re-establishing the original stream channel. The construction work involved grading the stream and clearing the old channel before diversion barriers were removed to divert stream flows from the existing channel to the new channel. The altered streambed contains ponds, swales and large rocks to produce well-aerated water with numerous areas for establishment of pre-mining creek habitat. Re-colonization by benthic invertebrates from upstream locations

following re-establishment of normal creek flow should result in re-population of the creek with a similar abundance and diversity of benthic organisms as present before mining occurred.

FIGURE 13. *Little Dry Creek in 2013.*

FIGURE 12. *Figure 12. Little Dry Creek in 2001 prior to reclamation activities near the pit lake and stream.*

Site Revegetation

A revegetation plan was developed to provide a sustainable, erosion resistant vegetative cover using site-adapted species. Distinct planting zones were created for the relatively steep upper mine slopes, relatively flat lower benches (adjacent to Little Dry Creek), and the graded mine waste pile in order to foster a diversity of plant communities and wildlife habitats throughout the site, and to provide an erosion resistant vegetative cover in areas with varying slopes, landscape position, etc. (Table 1).

All species listed were chosen based on their adaptability to the site, or for their erosion control or wildlife habitat potential. All native grass and forb seed used were from local northern California seed accessions. Seeds for the native tree and shrub species were obtained from areas adjacent to the mine site and are being grown as containerized seedlings.

The riparian zone along Little Dry Creek was revegetated after stream relocation in December and January 2002. The remainder of the mine site was revegetated in the Fall of 2002. Hand watering of the plants was required when they were planted in the Fall of 2002, and during the dry season in 2003 (April – September) until the trees and shrubs had been established.

Archaeological Investigations

Archaeological investigations were conducted and revealed eighteen historical features or elements of features. Archaeological findings included a 126-foot by 30-foot concrete platform, which apparently was used to dry copper cement with an associated strap rail system to move the material, and a subterranean tar and felt covered wooden containment tank, 24 feet long by 12 feet wide, with canvas gaskets designed to be placed between wallboards and

Table 1. Plants used for reclamation at the Spenceville Mine.

PLANTING ZONE	PLANT TYPE	PLANT COMMON NAME
Upper Mine Slopes	Trees and Shrubs	Foothill pine, Blue oak, Interior live oak, California buckeye, Redbud, Buckbrush, Coyote bush
	Native Grasses	Purple needlegrass, Blue wildrye, California oniongrass, Creeping wildrye
Lower Mine Benches	Trees and Shrubs	Blue oak, Interior live oak, California buckeye, Redbud, Coyote bush, Willow
	Native Grasses	Purple needlegrass, Nodding needlegrass, Creeping wildrye, Pine bluegrass, Blue wildrye, Squirreltail, California oniongrass, Deergrass
	Native forb seeds	Yarrow, Small-flowered lupine, California poppy, Spanish clover
Mine Waste Pile	Native Grasses	Purple needlegrass, Nodding needlegrass, Creeping wildrye, Pine bluegrass, Blue wildrye, Squirreltail, California oniongrass
	Native forb seeds	Yarrow, Small-flowered lupine, California poppy, Spanish clover

uprights. The most striking finds were made during mine waste excavation. A wooden conduit was discovered beneath tailings exceeding 25 feet in depth. The conduit was 134 feet long on a 10 percent grade with an internal channel that narrowed from six inches to four inches wide.

A settling tank and a tar-coated canvas covered wooden tank were discovered beneath tailings of 14 to 16 feet in depth. The mine pit proper revealed an incline on the southwest wall with only strap rails missing, and a partially timbered vertical shaft was discovered in the west wall. Two ore buckets were recovered both with wooden trap doors in the base and one bucket has remnants of tar lining the inside. Chinese porcelain and stoneware shards were found near some refractory ovens.

FIGURE 14. *Excavation of the building foundation near the pit, possibly adjacent to the headframe.*

Unexploded Ordnances

From 1941 to 1962, the Spenceville Mine area was under the jurisdiction of the US Army. Information received from the US Army Corps of Engineers indicated that there was a potential for unexploded ordnances (UXO) and chemical warfare material (CWM) at the site and, specifically, that one of the areas proposed as a borrow source for clean soil cover was used as a bomb test range. Based on this information, a UXO and CWM specialty contractor was retained to provide UXO and CWM construction support.

Results of a geophysical survey and visual reconnaissance yielded about 14 ordnance related items, primarily scrap from 81mm and 60mm mortars. No live ordnances were discovered. Subsequent activities addressed the potential for UXO and CWM in the mine pit, and the possibility of uncovering UXO during excavation of cover soil from the borrow areas. After the pit was dewatered, a visual and geophysical inspection of the pit bottom was conducted. UXO support continued during excavation and treatment of the pit bottom sediments and during stripping of the borrow areas for cover soil. While several ordnance related items were retrieved, including an M-1 clip, M-4 105 shell casing, parachutes, gas tanks, no live ordnance was discovered.

FIGURE 15. *The bottom of the pit and, aside from various vehicles and rubbish, no UXOs were discovered.*

Summary

The Spenceville Mine Closure and Reclamation took approximately two years to complete and was named the California Governor's Award for Environmental Projects in 2002. The project success was due to the early development of a solid closure plan and the creation of a project team consisting of consultants and State engineers and geologists who worked diligently and tirelessly to complete the project. The Spenceville Mine site has been returned to usable open space consistent with the intent of the wildlife refuge. The project accomplished the following:

- The mine pit was drained in eight weeks and treated water was used to irrigate nearby fields.
- The pit was backfilled with neutralized mine waste and then covered with clean fill. The shafts and adits were also treated and filled to minimize seepage.
- The site was contoured to fit pre-mining contours and much of the area has already been revegetated.
- The nearby stream, Little Dry Creek, was moved to its original location and stream habitat restored. Seeps and overflow from the flooded mine pit were eliminated.
- Intensive archaeological studies unearthed old mining structures and sites of cultural interest that were catalogued and preserved for future access.
- Surface water and groundwater have been restored to near pre-mining conditions. Both will be monitored for many years. ■

Acknowledgments

The author works for Sovereign Consulting, Inc., 3100 South Airport Way, Seattle, WA 98134. He wishes to express thanks to Dan Wanket and Alberto Pujols, GEI Consultants, Oakland, CA, for project engineering support and digital recoding of the project. Dan Wanket also provided an earlier summary of this work for the Spenceville project managers from which I have borrowed liberally.

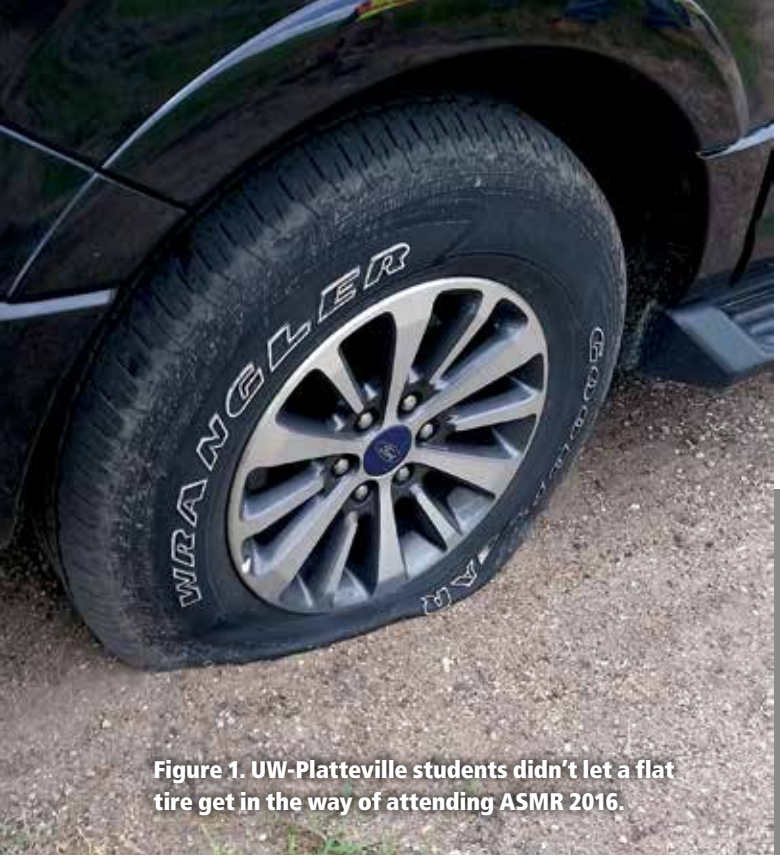

Figure 1. UW-Platteville students didn't let a flat tire get in the way of attending ASMR 2016.

Spokane or Bust

The Adventures of the UW-Platteville Reclamation Student Group

By Yari Johnson

Life changing. That was the most commonly repeated phrase during the University of Wisconsin-Platteville's summer Reclamation Demonstration Field Trip. Thirteen undergraduates in the Reclamation, Environment and Conservation (REC) program, led by Dr. Yari Johnson, traveled more than 3,000 miles to attend the 33rd Annual Meeting of the American Society of Mining and Reclamation in Spokane, WA. For many of the students, it was their first time visiting an operating mine, seeing mountains, or staying in an upscale hotel. The 12-day trip included stops at Spencer Quarries in South Dakota, Black Thunder Mine and the Yellowstone Bighorn Research Association geology camp in Wyoming, and the Mollet Park Wetland Restoration near Missoula, Montana.

The first stop included a quartzite mine tour arranged by REC alumnus, Brooke Muhlack, who is the Environmental Manager for Knife River Midwest, LLC (Figure 2). Brooke also led students to tour Knife River's repaving operations along I-90 near Murdo, SD. Students learned about the environmental regulations behind repaving and operating a cement plant. The paving operation was not going well on the day of the visit due to cracking issues (Figure 3).

For an extra treat, the REC students skipped Wall Drug and headed to the Badlands National Park to learn about geologic erosion and improve their rock climbing skills (Figure 4). Then it was off to tour the Black Thunder Coal mine in the Powder River Basin of Wyoming. Dr. Johnson was able to secure this once-in-a-life-time tour through Rio Franzman, Natural Resource Project Manager at SWCA Environmental Consultants, whom he met at the 2014 ASMR Conference in Oklahoma City. Rio connected Yari with Lynn Sweet and Joel Coast of the Thunder Basin Coal Company, who gave the REC students the grand tour of mining operations and their award-winning reclamation sites (Figure 5). Students got to see one of the world's largest draglines in opera-

tion. They also learned about the strict social media guidelines that large mining companies follow and thus there are not any pictures of the tour here.

A few days at the Yellowstone Bighorn Research Association in Red Lodge left many students yearning to move to Montana. The views from the cabins were breath-taking (Figure 6). Dr. Mari Vice led students on a geology and mining tour of the region around the camp. After a short stop in Yellowstone National Park, two trips over the Beartooth Pass and a snowball fight at 10,000 feet elevation in June, the students got to learn about converting ponderosa pine plantation into wetlands at the Mollet Park near Missoula, MT.

Students did their best to impress employers and professionals at the ASMR Conference in Spokane (Figure 7). The group was soon known as the "reclamation students from Wisconsin." They also made a surprising connection when they met Michael Vice, reclamation specialist for the Monsanto Company in eastern Idaho, who turned out to be a 1989 Reclamation alumnus from UW-Platteville. On the last night of the conference, students went out to enjoy the sights and sounds of Spokane (Figure 8) and left with dreams. If all goes well, some of the students will be returning to the West next summer for jobs and internships. ■

FIGURE 2 (Above and below). *At Spencer Quarries students learned about mining Sioux Quartzite and got hands-on experience with the Pit Viper 351 – Blast Hole Drill made by Atlas Copco out of Wisconsin.*

Figure 3. Students saw reclamation at the Black Thunder Mine.

Figure 4. Touring Badlands National Park. Dr. Johnson made sure to deduct points from Austin Loeffelholz's final grade for wearing a Wisconsin Badger's shirt.

Figure 5. Visiting the Black Thunder Mine was the high point of the trip (Left to right: Dillon Villhauer, Jeffrey Jacobs, Dan Brumm, Zachary Streckenbach, and Dr. Yari Johnson).

Figure 7. Reclamation students networking at the Early Careers Professional Event evening social.

Figure 6. Students enjoyed stunning views from the cabins at the Yellowstone Bighorn Research Association camp in Red Lodge, MT.

FIGURE 8. *Dan Brumm, President of the Reclamation Club at UW-Platteville, enjoyed eating Ethiopian food while visiting Spokane for the ASMR Conference. In fact, he kept having dreams about the food after we left. Life changing!*

Sustainable Remediation of Abandoned Mercury Mines in California

By Dave Jenkins and Andrew Campbell

Figure 6

Mercury mining in California ceased decades ago, however there is still believed to be more than 2,000 abandoned mercury mines that have yet to be investigated, 900 of which are formally documented. Many of these mines have open adits (Figure 1), and have tailing piles which are generating impacted runoff that are making their way to seasonal gullies, creeks, lakes and other sensitive ecological resources (Figure 2). The majority of these sites are on federal lands with limited funding to mitigate impacts. Therefore, a cost effective strategy to handle these sites is paramount to achieving reclamation with limited funds.

Figure 1

At the Rathburn abandoned mine site in Colusa County California, mitigation of tailings containing mercury was achieved without an impermeable cap or leachate collection system, the presumed strategy for mines of this type. Located in the Sulphur Creek Mining District on land owned by the Bureau of Land Management (BLM), the project involved stabilizing and capping 33,000 cubic yards of mercury-contaminated soil using a sustainable, ecologically-friendly permeable cap. The cap was constructed of local borrow soil and seeded with native grasses and shrubs, which blended the installation into the local environment. The strategy saved the BLM over a million dollars in construction and long-term maintenance.

The work was performed as a Non Time Critical Removal Action (NTCRA) under CERCLA in order to mitigate the potential for human and ecological risk, particularly of mercury impacts due to surface runoff, erosion, and leaching. The investigation began with sampling of the waste materials. Acid-Base Accounting analyses showed the neutralization potential of the waste was well over three times the acid-generating potential. The highest deionized Waste Extraction Test (similar to SPLP outside California) yielded 0.198 mg/L for mercury. The STLC for mercury is 0.2 mg/L, indicating the worst case for the waste is below the regulatory threshold for leaching potential.

Groundwater wells were installed and sampled, one up-gradient and one down-gradient of the mine. All wells contained mercury below the California MCL of 2 µg/L confirming the low concentrations of mercury from whole rock leaching tests. As

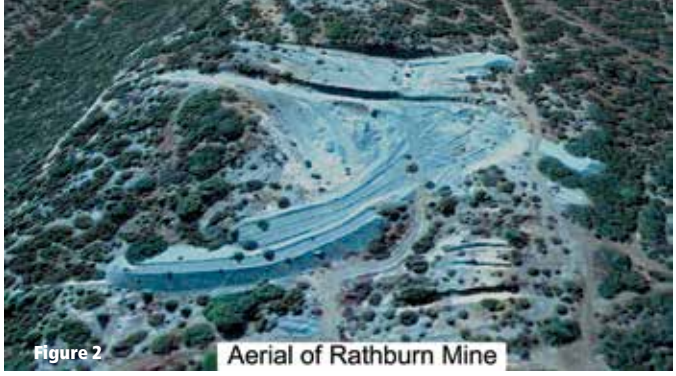
Figure 2 Aerial of Rathburn Mine


Figure 3


Figure 4


Figure 5 Finished CAP

a result, the California Water Board agreed the waste was Group C mining waste and therefore no bottom liner was necessary. This allowed the design to be simplified because it removed the requirement for remedial technologies for mercury leaching. A more sustainable design could also be developed, since geosynthetic materials would not be required, would not need to be the transported, and fuel would not be required to prepare the site for application (Figure 3). The cost savings of eliminating the leachate consideration from the remediation strategy was estimated to exceed $1.1 million.

To prepare the permeable cap, a borrow source needed to be identified. The BLM identified two sources meeting soil media requirements: one that was two miles away and another eight miles away – a long, expensive haul. Both identified sources were sandstone-based soil. As such, it was determined that double the soil volume would be required to achieve sufficient depth to facilitate revegetation, which added considerable cost.

Sandstone and serpentine layers have differing levels of calcium and magnesium, making an inconsistent root zone for vegetation. Invasive plants can grow in the sandstone soil more easily, where calcium levels are higher. Deeper rooting plants can get started in the high calcium sandstone, but when their roots encounter the serpentine soil below with high magnesium, plant root growth is hindered. The plants become weak and can't grow to their full potential. The invasive species then take over. However, the invasive species can't grow in the high magnesium serpentine soil native to the area. Adjacent serpentine soil was a shorter haul, but it too had disadvantages. The soil included considerable rocks exceeding two inches (interference with compaction) creating vulnerability to erosion since natural vegetation would be sparse and re-establish slowly. The most desirable erosion control would be to allow water to infiltrate while vegetation grows back and this was acceptable considering water infiltration was not shown to cause leaching.

BLM agreed to use the native serpentine top soil for a savings of just over $100,000 in material and transport costs. The larger rocks were not a problem because, for the intended design, compacting the top soil is not desirable as native plants would struggle to grow in it. The slopes on the cap were kept gentle to promote infiltration and vegetation slash was placed on the surface of the cover soil to promote plant growth (Figure 4). In total, making the case for a novel cap design that was permeable and unlined saved the BLM over 1 million dollars in construction and maintenance costs and created a more sustainable, natural, ecologically-beneficial, and aesthetically pleasing final installation (Figures 5 and 6). ■

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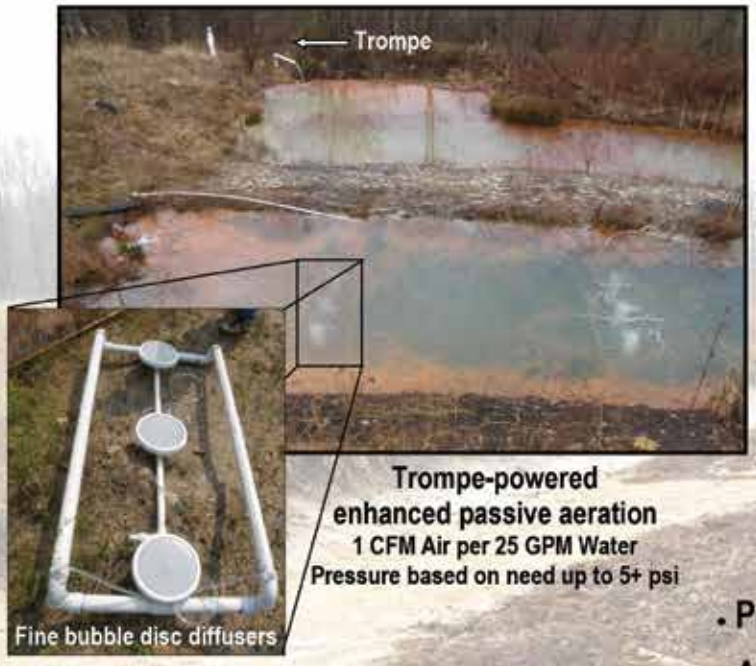

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